Abstract

Flexibility of the Council for Scientific and Industrial Research’s Rheocasting System (CSIR-RCS) and its rheo-high pressure die casting (R-HPDC) technology is again demonstrated, as with aluminium alloys, by processing and shape casting of three different magnesium alloys (AM50A, AM60B, AZ91D) in a first attempt. All as-cast microstructures are characterised more by rosette shaped globules of the primary-(Mg) phase together with Mg(sub17)Al(sub12) as evidence of nonequilibrium cooling rates. Surface liquid segregation is observed in the as-cast microstructure for all three alloys. Minor alloy additions of Mn, in composition specifications, results in the formation of Al8Mn5 intermetallic phase particles dispersed throughout the microstructure. All alloys were homogenised at 415 °C for 16 hours for the T4 condition. The Mg(sub17)Al(sub12) phase dissolves with homogenisation while the Al(sub8)Mn(sub5) intermetallic phase does not dissolve. The resulting tensile properties of all three alloys in the as-cast and T4 conditions are reported.